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THE RELATIONSHIP BETWEEN LAND USE AND ENVIRONMENTAL PROTECTION

by

E. J. Croke, R. G. Crolla, A. S. Kennedy, and I. J. Hoover

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296

BIBLIOGRAPHIC DATA SHEET	1. Report No. APTD-1105	2.	3. Recipient's Accession No.

4. Title and Subtitle
The Relationship Between Land Use and Environmental Protection

5. Report Date
March 27-31, 1972

6.

7. Author(s)
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8. Performing Organization Rept. No.

9. Performing Organization Name and Address
Argonne National Laboratory
Center for Environmental Studies
9700 South Cass Avenue
Argonne, Illinois 60439

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address

13. Type of Report & Period Covered

14.

15. Supplementary Notes
A Briefing Document for the Joint Meeting of the President's Water Pollution Control Advisory Board and Air Quality Advisory Board

16. Abstracts

The case is outlined for integrating land-use planning and regulation with environmental protection. This document indicates some of the legal, institutional, organizational, and technical aspects of this approach to the preservation of environmental quality. There is a growing recognition of the need to subject public and private decisions regarding land use to a much closer scrutiny with regard to their environmental implications. A great deal of legislative and organizational activity has taken place in the past few years regarding this issue. An array of evaluative techniques now used either for land-use planning or for environmental planning may be of potential use in formulating environmental land use policies. If land use guidance and environmental protection objectives are to be integrated, programs for merging the procedures and practices of groups involved in these functions must be developed. The feasibility of employing land use as a means of environmental protection, as well as its eventual effectiveness, will depend very heavily on how effectively appropriate liaisons can be established between responsible agencies at the Federal, State and Local levels.

17. Key Words and Document Analysis. 17a. Descriptors

Air pollution
Land use
Planning
Regulations
Legislation
National government
State government
Local government
Urban areas
Regions

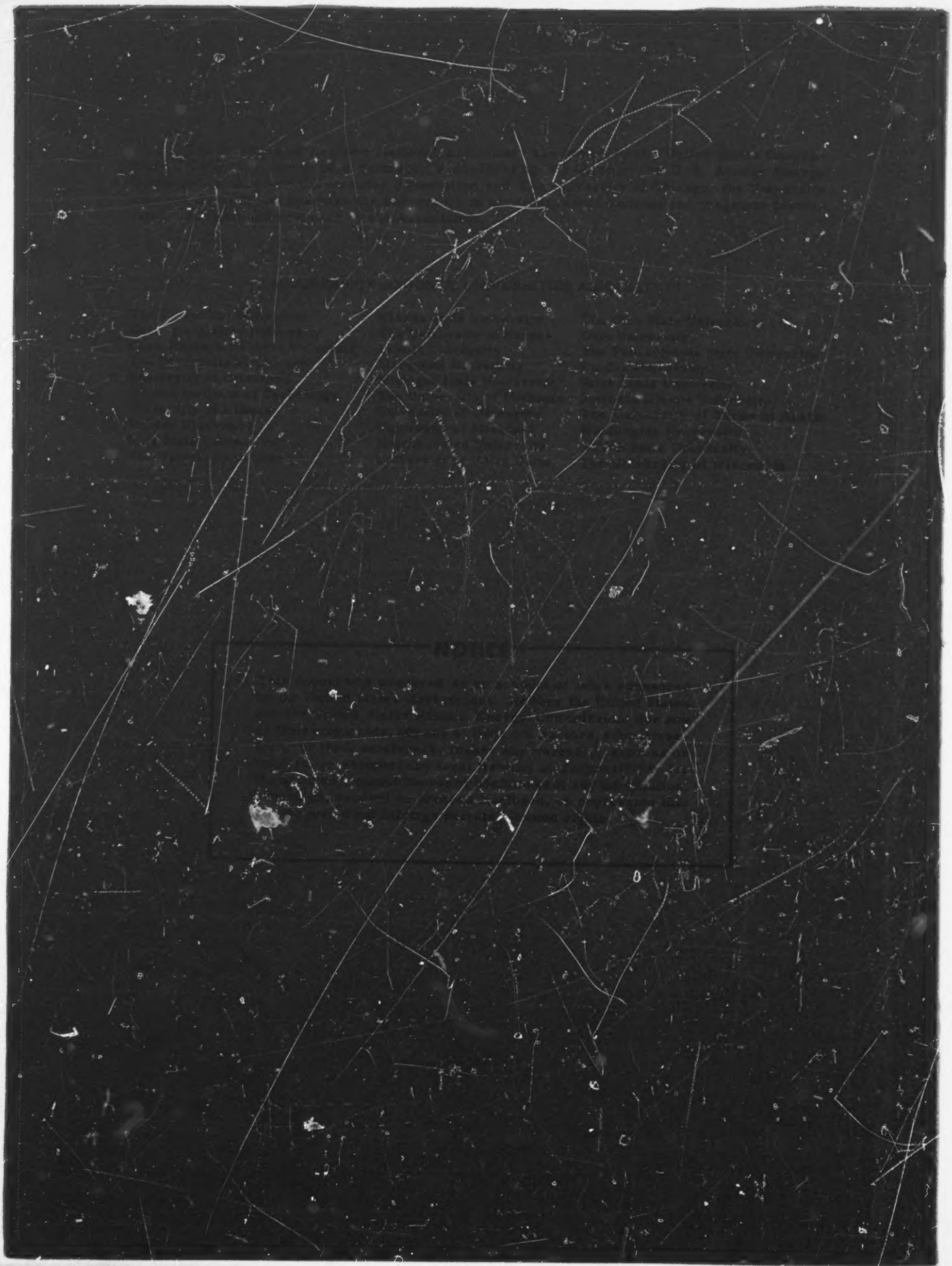
17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group 13B

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Unlimited	UNCLASSIFIED	~~63~~ 56
	20. Security Class (This Page) UNCLASSIFIED	22. Price

FORM NTIS-35 (10-70)

USCOMM-DC 40329-P71



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President's Water Pollution Control Advisory Board
and Air Quality Advisory Board

March 27-31, 1972

FOREWORD

On March 27, 1972 a joint meeting of the President's Air Quality Advisory Board and Water Pollution Control Advisory Board will convene to evaluate the issues and problems associated with the employment of land use controls as a mechanism for environmental protection. The meeting will focus on some of the issues raised by the impact of land use decisions on environmental quality. These include: the effect of past land use decisions on present environmental quality; the impact of present land use decisions on the future attainment and maintenance of environmental quality standards; the availability of planning tools in assessing the environmental impact of present land use decisions; the need for enabling legislation to support land-use-oriented environmental protection programs; methods by which local, state, and federal land-use-oriented environmental protection programs could be initiated; and ways by which the public can manifest its preferences with regard to environmental protection programs which involve the monitoring and channeling of urban and regional growth.

In order to obtain information regarding the complex relationship between land use and environmental quality, witnesses from a broad spectrum of backgrounds have been invited to testify at this meeting. Their testimony will aid the President's Air Quality Advisory Board and Water Pollution Control Advisory Board in the preparation of recommendations regarding the applicability of land use controls to environmental protection.

This report was prepared as a briefing document to assist the board members in their preparation for this meeting. It presents background information relating to the land use issue, and includes examples of the impact of past land use development practices; examples of development decisions that will affect the quality of our environment in the future; historical perspectives of environmental protection activity and land use development practices; and isolated examples of the merging of environmental concerns with the land use development process. Although the report is not a definitive treatment of this complex issue, it is hoped that it will stimulate the witnesses and the board members to address the many and difficult questions associated with the application of land use planning and controls to the environmental protection process.

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ABSTRACT

Present environmental protection programs have, for the most part, been aimed at the application of the best available control technology to existing sources of pollution. It is anticipated that these programs will, for the most part, result in the attainment of the environmental quality standards established for the more significant pollutants. However, in certain highly developed and urbanized areas, the concentration of pollution producing sources is such that the application of the best control technology may not suffice to achieve environmental quality standards. In other areas, economic development and population growth may result in the obsolescence of pollution control programs that are initially effective.

The geographical concentration of pollution producing sources and economic developments are a direct result of past and present land use decisions. The impact of these decisions on the environment is difficult to assess, but the initial indications make it appear that these decisions have had a significant effect on environmental quality. This effect, moreover, may be difficult to reverse through the use of available control technology if it is not supplemented by some type of control of the future location of pollution producing activities.

If some form of land use guidance or control is employed to channel economic development in such a way as to assure the maintenance of environmental quality standards, the methods, procedures and activities of land use planning and regulatory agencies would have to be integrated with those of environmental protection agencies in order to administer such programs. Traditionally, these two types of agencies have employed distinct techniques and have promoted separate programs at the local, state, and federal levels.

Recent recognition of the relationship between land use and environmental quality has indicated the need to assess the feasibility of developing a national policy with respect to the application of land use planning and control to environmental protection. If such a policy is formulated, it could be implemented either through the creation of new institutions or through the establishment of new responsibilities and relationships among existing agencies and departments of government.

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1. INTRODUCTION

In the past five years, the term "environmental protection" has been transformed from a concept existing in the minds of a select group of specialists and concerned citizens groups to a national issue of the highest priority. In response to this development, it became necessary to review the processes by which goods are produced, consumed, and ultimately disposed of in the United States, with respect to the environmental consequences of these activities.

In order to accomplish this, the federal government initiated a comprehensive series of programs. Numerous studies were conducted to identify the environmental damages resulting from industrial, commercial, residential, agricultural, and transportation activities which constitute the prime sources of pollution. Federal, state, and local legislative programs giving broad powers to regulatory and enforcement agencies were enacted, and enforcement actions have taken place at every level of government.

One of the more significant steps forward occurred when the Federal Environmental Protection Agency (EPA) was established within the executive branch of the government. Simply stated, the mandate of the EPA is to define environmental quality standards and to provide leadership and assistance to state and local governments in establishing programs designed to achieve and enforce these standards. In particular, The Clean Air Act as amended in 1970 and the Federal Water Pollution Control Act provide the EPA with the authority and responsibility to restore and maintain the quality of our air and water resources.

Under this mandate, environmental quality standards have been established, and the guidelines and framework within which state and local governments must plan and implement programs designed to achieve these standards have been developed. As part of this program, the EPA has engaged in and promoted surveillance, enforcement and monitoring activities; provided financial and technical assistance to state and local governments; and supported research, planning and technological assessment programs at the federal level.

This effort has, until now, emphasized the abatement and control of pollutant discharges through the application of appropriate control technology to individual sources of pollution. This emphasis occurred because of the acute need for prompt and effective control of existing pollution sources and the current availability, at the state and local levels, of institutions geared to the administration of traditional, technology-oriented regulatory activities.

The initial focus on source control technology represented an essential first major stage of the national environmental protection program.

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environmental protection controls are presented separately and recent attempts at integrating these forms of control are documented. Finally, the federal role is considered with regard to its present and potential capability of fostering land use planning and environmental control.

2. THE IMPACT OF LAND DEVELOPMENT ON ENVIRONMENTAL QUALITY

The full impact of past and present land use decisions on environmental quality is still not fully understood or documented. From a preliminary examination of individual instances when past land use or developmental decisions have generated a significant degree of environmental degradation, four conclusions may be drawn:

1) The environmental impact of land use development is pervasive in that almost all forms of economic activities--residential, industrial, transportation, recreation, etc.--have contributed to some instances of environmental degradation.

2) The environmental impact of present economic developmental decisions will be of a prolonged nature and may be irreversible.

3) The environmental problems posed by past land use or developmental processes are not always susceptible to solutions involving the application of a control technology.

4) The environmental consequences of land development decisions are not fully perceived when these decisions are made.

2.1 The Pervasive Nature of Environmental Impacts Caused by Past Land-Use Decisions

The extent of environmental impacts caused by past developmental decisions can be graphically illustrated by documenting several examples drawn from the area of transportation planning, industrial and residential development, and recreational and agricultural activities.

In the area of transportation planning and development, many instances of severe environmental consequences caused by the introduction of new transportation systems can be cited. For example, as of January 15, 1972, it appears that many major urban areas will be unable to attain current air quality standards for the vehicular pollutants unless current emission control technology is supplemented by transportation system controls. The urban areas which may require such environmental land-use control are not limited to any specific geographical area of the United States. They include Los Angeles, New York City, Sacramento, Portland, Seattle, Boston, Salt Lake City, Denver, San Francisco, Dayton, Phoenix, Fairbanks, Minneapolis-St. Paul, Baltimore, San Diego, the San Joaquin Valley, Las Vegas, Houston, San Antonio, and El Paso.

Increased air transportation has caused a trend toward industrial location and housing developments near major airports. Problems of air pollution, water pollution, noise nuisance, and potential accident hazard to

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the resident population have resulted, even though the airport was initially located in an isolated area. The construction of the Palmdale, Everglades, and Jamaica Bay airports has been delayed in consequence of the need to assess the potential environmental hazards associated with these facilities.

Urban expressways generate noise which has proved to be a serious handicap to school activities. Among the growing number of suits filed against state highway departments are included an award of $165,000 to the Elizabeth, New Jersey, Board of Education for damages arising due to noise from Interstate 278.

Rapid or excessively intensive residential development is also causing environmental problems in various regions of the United States. In Fairfax County, Virginia and Du Page County, Illinois moratoria were placed on sewage connections because the capacity of local waste water treatment facilities has been saturated as a result of rapid development. In effect, these actions constitute a moratorium on land development. Intense geographical concentrations of industrial activities have long been recognized as placing a stress on the air quality of surrounding regions. Steel mills in Illinois and Indiana along Lake Michigan now account for 40% of the maximum SO_2 concentrations and 75% of the particulate concentrations in that area.

The wide dispersion of residential communities and suburban industry can, on the other hand, compromise the development of efficient and economical waste water treatment systems. Appropriate clustering of such activities can enhance the effectiveness and reduce the cost of pollution control. In Cleveland, Ohio, joint treatment, recycling and reclamation systems for the waste produced by metal plating firms became feasible because these activities were spatially clustered.

Failure to take account of the fact that some intensively developed areas are particularly susceptible to environmental pollution as a result of meteorological conditions, topographical features, soil structure etc. often leads to environmental degradation. For example, the densely populated Willamette valley of Oregon now has a chronic air pollution problem that has been compared to that of Los Angeles. In the absence of restrictions on development, the population of the valley is expected to increase by more than 80% between now and 1985. This population growth will further aggravate the problem by generating significant increases in automotive travel.

Lastly, the pursuit of recreational activities has also had adverse effects on our national forest and scenic areas. Burgeoning second-home and resort development has caused considerable alarm in states such as

Vermont, Maine, Colorado, and Hawaii. These states are moving to protect their natural areas by developing strict land-use regulatory programs to be administered by state agencies.

2.2 The Irreversibility of Environmental Problems Caused by Land-Use Practices

We may distinguish two cases of irreversibility--physical irreversibility and socioeconomic irreversibility. Physical irreversibility implies that even if we ceased to pollute or degrade the environment, natural regeneration would not restore the resource to an acceptable or desirable quality. Such is not the case with air contaminants that would be washed out, for the most part, in a short period of time if all emissions were to stop. Water resource regeneration, however, generally will take much longer; indeed, certain lakes may become essentially irreversibly polluted. Reforestation, strip mine reclamation, and shoreline dunes regeneration are other examples where regeneration by natural processes may take many years to accomplish.

In the absence of a land management program, the use of unsuitable land disposal methods for liquid and solid wastes may result in nearly irreversible contamination of groundwater supplies and surface receiving waters. The discharge of 20,000 gallons per week of toxic industrial waste on a land disposal facility in Logan Township, New Jersey, may generate irreversible damage to both the local groundwater resource and nearby Raccoon Creek--a tributary of the Delaware. Orange County, Florida, is another example, where intensive urbanization, the discharged waste from citrus processing plants, and indiscriminate use of pesticides and fertilizers has resulted in the pollution of the groundwater supply.

A second form of environmental irreversibility has to do with the workings of our socioeconomic system. Our large urban complexes have evolved over several decades and some have been in existence for centuries. Buildings, transportation systems, and public services are designed for long economic lifetimes. Decisions to encourage and even subsidize private automotive transport systems have evolved a certain urban form and lifestyle. Although strict controls on automotive emissions have been promulgated and will have a significant effect on the amount of these pollutants, the continued rise in vehicular miles in large urban areas, such as Los Angeles, may again threaten the air quality of that city regardless of the control technology employed.

The investment in new town development and urban renewal throughout the nation has been quite substantial in the past few years. The consequences of these large scale public and private investment programs are also likely to be difficult to reverse. Decisions being made now with regard to the location, type and quantity of such housing developments may have an effect upon the localized environment within the area of these projects for long periods to come.

The interlocking urban system that has evolved because of these transportation and development decisions cannot be rearranged easily. Many years must be spent before such areas can be restored to environmental balance, if indeed this is possible.

2.3 The Capability of Pollution Control Technology to Lessen the Environmental Impact of Land-Use Decisions

The effectiveness of the application of control technology to environmental problems caused by past land-use decisions is often severely limited. Reference has already been made to the projected failure of automotive emission controls to attain certain air quality standards in some major American cities. Other serious pollution problems regarding the use of land have also arisen which do not seem susceptible to the application of control technology or the alteration of present techniques. For instance, although some states are currently considering restrictions on the amount of nitrogenous fertilizer that can be applied per acre, such controls may not be effective unless they are applied in conjunction with the establishment of buffer zones between agricultural areas and natural receiving waters. Buffer zoning may also be the only effective means of preventing silting and sedimentation of streams as a result of erosion due to farming, earth moving, and strip mining activities.

In many instances, land-use regulation may be the only feasible strategy of pollution control available. This is particularly the case for area-wide sources of pollution, such as agricultural activities, strip mining, and indiscriminate dumping of liquid and solid wastes on land disposal sites. It is estimated by the EPA and the Department of Agriculture that between 50 and 75% of the 4 billion tons of sediment washed into the nation's waters annually comes from crop and pasture lands. Much of this sediment is high in fertilizer, nutrients, pesticides and herbicides. Feedlot operations complicate agricultural runoff even further. A feedlot for 10,000 cattle, for example, produces nearly 750,000 pounds of waste per day,* and much of this waste finds its way to ground and surface waters.

Recognition of the fact that control technology alone may be insufficient to protect natural receiving waters adjacent to developing areas has resulted in such shoreline land-use regulatory programs as those adopted for San Francisco Bay, Lake Tahoe, and the coastal areas of Maine, Vermont, Wisconsin, and Hawaii.

2.4 Land Development and Unknown Environmental Impacts

The long-range environmental effects of past land development decisions are not always perceived or known when development decisions were made. Even when adverse effects were perceived, they may have been discounted in the face of economic growth incentives.

*Source: Office of Water Programs, EPA.

Public capital expansion programs provide excellent examples of this phenomenon. Airports sited in rural areas almost inevitably cause rapid economic expansion that compounds environmental problems. Sewer facility construction encourages growth and residential development in open space and scenic areas. New or improved road systems induce congestion and sprawl, and are saturated in a short time. Water treatment facilities improve riverside property and may subsequently lead to development which overloads the capacity of the treatment facilities and returns the water to its polluted state.

Significant decline of land values has been experienced in the vicinity of many major airports. The unsightly and uncoordinated developmental sprawl that has occurred in the area of facilities such as Chicago's O'Hare Airport could have been avoided if it had been foreseen. To remedy the problem caused by airport noise and air pollution, massive and extremely costly land acquisition programs have been undertaken in the vicinity of some airports. The City of Los Angeles is spending almost $300 million to eliminate nearly 2000 private homes ranging in value from $28,000 to $115,000 in a 400-acre area surrounding Los Angeles International Airport. More than 8000 people will be displaced in order to develop a buffer zone which could have been established at minimal cost through effective use of airport zoning a few years ago.

Our economic system, in the past, has been geared to allow questionable facilities to locate and operate before all the environmental risks have been evaluated. These examples indicate a need for a unified system of projection, evaluation, and information dissemination before environmentally hazardous or degrading facilities are constructed.

3. HISTORICAL PERSPECTIVE OF LAND-USE PLANNING AND DEVELOPMENT PRACTICES

The process by which the public effects changes in land-use patterns can be thought of as a matrix of interacting institutions and techniques. The process is a complex and frequently confusing one consisting of the formulation by planning institutions of land guidance policies whose adoption and execution ultimately depend upon the diverse political, social and economic constraints affecting land use. Thus, although planning institutions and techniques cannot be considered as independently functioning systems of land use guidance, these institutions and techniques do represent a potential source of policy guidance in assessing the environmental impact of land-use decisions.

3.1 Land Guidance Institutions

The public institutions most concerned with guiding land use are primarily planning agencies. The term "planning agency" refers to any of several organizational forms with various scopes of responsibility at different levels of government. These are public and quasi-public agencies operating at the local (city or county), metropolitan, regional, and state levels and having "comprehensive" planning responsibilities.

The traditional concern of local (city and county) planning agencies has been with land use as exemplified by their research and plans, and the land-use controls they frequently administer. Land use remains their principal concern, although many have broadened their activities to include social and environmental issues. In the past, most agencies took the form of a planning staff reporting to a lay commission or board which, in turn, reports to the chief executive. An increasing number of planning directors report directly to the chief executive.

Planning agencies at the local government level essentially consist of city, county, and combined city-county agencies. Such agencies research, prepare, and, to varying degrees, implement plans for a variety of local concerns such as the use of land, transportation, public services, community facilities, and so forth. They also conduct research and studies in such areas as housing, open space and recreation, urban renewal, and educational and health care facilities. They collect and analyze data in support of public policy regarding many phases of community development. Local planning agencies have traditionally been concerned largely with land use, and have assisted in administering such controls as zoning and subdivision regulation. State enabling legislation in all fifty states has delegated the powers of land-use regulation to local city and/or county governments.

Planning at the metropolitan and regional level has undergone dramatic change in the last few years with the enormous increase in the number

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of councils of governments (COGs) governed by local elected officials, many of which replaced existing metropolitan or regional lay planning commissions. A recent listing of some 585 metropolitan and regional agencies includes 328 COGs and 111 economic development districts, with most of the remainder being regional planning agencies.

The rapid increase in the number of COGs (from 19 in 1966 to 328 in 1971) and the regional planning agencies in general is directly attributable to their favored treatment by the federal government. Starting with the initial funding authorization in the 1965 Housing Act, federal matching funds have been available to regional councils for an increasing number of programs, including planning for housing, criminal justice, and water and sewer systems.

Much of their strength derives from the Department of Housing and Urban Development requirement that there be a "certified" regional planning activity in every metropolitan area in order to qualify communities for receipt of bonus grants for water supply and sewage system construction and for open space purchase. The 1966 Demonstration Cities and Metropolitan Development Act added additional strength by empowering such agencies to review applications for federal grants from public and private bodies. Among documents requiring their review are environmental impact statements prepared in conjunction with any federal or federally-assisted project or program. As of April 1971, the federal Office of Management and Budget had designated 403 metropolitan and regional bodies, commonly called "clearinghouses," to conduct such reviews. The eventual result of this program will be to set up the machinery for an orderly review of the environmental impact of federal grant projects on a regional level.

From their initial concern with public works in the 1930's, state planning agencies have also grown in numbers and have changed their activities substantially. There are now planning agencies in all 50 states, many of which perform statewide physical, social, economic, and environmental planning. Much of the impetus again comes from the federal government in the form of planning funds (since 1961), and federal program review responsibilities. A few state planning agencies continue to focus on economic development, or the administration of local planning assistance funds.

The focus of state planning has largely been on staff assistance to governors and legislatures. Twenty-seven states have planning agencies which are concerned with state government generally and are not restricted to industrial development and other limited-purpose functions. The location of the state planning agencies within the state governmental hierarchy as shown in the following table is an indication of their general emphasis.

Location of State Planning Agencies, 1969

Location	
Governor's Office	20
Department of Administration or Finance	7
Department of Community Affairs	3
Department of Commerce, Development or Planning and Development Agencies	13
Independent Planning Agency	5
Other Agencies	2
Total State Planning Agencies	50

Source: The Book of the States, 1970-1971 (Lexington, Ky., The Council of State Governments, 1971), p. 441.

When located at the governor's office, state planning agencies are used as staff support to the governor in making government-wide policy decisions. There exists a general trend toward bringing state planning agencies into the central decision-making arena and out of the special purpose functions of the past. However, some states have yet to regard planning as having an important role in central policy-making. Some state planning agencies serve as mere "data-banks" or carry out other specific support functions, such as federal grantsmanship or providing planning assistance to local governments. State planning is often not supported by state legislatures, many of which are not convinced of the need for planning at the state level.

Planning agencies at all levels may be considered key advisors to those who make land-use guidance decisions: local, state and federal governments. Except in some rare instances discussed below, planners do not make final decisions themselves. Even on the regional level, a policy-making body of elected officials or lay citizens determines official agency policy, not the professional planners.

Many other public bodies influence or guide land use. These include state and local highway and public works departments as well as environmental control agencies (e.g., California's pollution control districts) and special districts for transportation (e.g., Bay Area Rapid Transit District; New York's Metropolitan Transit Authority) and utilities (e.g., The Metropolitan Sanitary District of Greater Chicago). These agencies, unlike the planning agencies, have not been given direct responsibility over land use, yet their decisions have a significant and lasting influence over the pattern and character of land use. Frequently, their decisions are at odds with the objectives of the planning agencies.

3.2 Land Guidance Tools and Techniques

The system of land-use guidance techniques used by planning agencies may be divided into five categories: advice, controls, inducements, development,* and acquisition.

Advice is the oldest and most frequently-used device. Planning agencies give advice to governmental departments and officials, to other governments, to private organizations, and to individuals. They may do this in response to requests for assistance, because of a state or federal review requirement, or at their own initiative. The most common form of planning advice is the comprehensive plan itself, which sets forth policies and guidelines for future development, usually based on a set of objectives and future projections. Such plans seldom carry any legal authority except to commit a legislative body to a general course of action and, when used effectively, to establish the framework for the laws and ordinances which control private development decisions. Many planning agencies also prepare capital improvement programs which set forth the community's intended capital expenses over the next 5 to 7 years.

Controls, especially land-use controls, have been the major tools used by local governments to implement their plans. Such controls include zoning, which separates land-use activities into districts and establishes density, height, bulk, and related provisions; subdivision regulations, which set standards for land conversion and new development; and the less-commonly used official map, which delineates and reserves sites for future parks, schools, streets, and other public uses. Related to these are housing and building codes which set standards for new building construction and dwelling maintenance. Although zoning has traditionally been oriented to the separation of different land use activities, it may take other forms, such as: the setting of performance standards under which zoning districts are established, based upon the allowable external nuisance impact of an operation, the regulation of the location of special sources of pollution such as power plants, or the establishment of special buffer zones to protect areas from environmental contamination.

Inducements or incentives have been used to attract particular land uses and development which contribute to certain objectives. Land-use programs, for example, have begun to offer incentives through (a) planned unit development provisions which encourage improved subdivision design and greater retention of open spaces, and (b) density bonuses for buildings which provide such amenities as open plazas, direct access to public transportation, and enclosed walkways.

Such other devices as low-interest loans, tax exemptions, aids in land assembly, and direct subsidy payments have been used to attract activities deemed especially desirable.

*John Reps, "Requiem for Zoning," Planning 1964 (ASPO, 1964), pp. 56-67.

Public land development or public works had a great effect on shaping and directing urban growth through construction of transportation systems, public institutions (e.g., state colleges and hospitals), and utilities. In the past, public works have usually been constructed in response to development or market pressures; recent years have brought an increasing awareness of the impact of public investment decision on establishing an infrastructure for private decisions. The role of a new highway or a sewer system in influencing development direction has clearly been recognized, although not fully utilized.

Finally, acquisition involves the direct purchase of lands for the purpose of conserving their present recreational characteristics. The purchase of land for forest preserves, parks or green belts would fall under this category.

3.3 The Effectiveness of the Land-Guidance System

Overall, the land-guidance "system" does not operate very systematically. The failings of the system--or nonsystem--have been well documented. The more fundamental problems with the system include the following:

1) A far more extensive history of applying controls than using preventive or incentive devices;

2) The balkanization of guidance techniques among numerous local governments (balkanization presents a special problem since environmental issues almost always are regional in scale);

3) The lack of effective techniques to resolve competition among jurisdictions for high tax ratables--usually industry--which underlies all other land-use decisions;

4) The fact that most decisions remain private, reflecting the feeling that land is a private commodity rather than a community resource;

5) The weakness of enforcement power and its susceptibility to political and economic pressures;

6) The lack of relation between--and occasional conflict among--the various techniques, and their sponsoring governments;

7) The frequent lack of relation of the system to a generally-accepted plan.

The lack of a single institution with total responsibility for guiding or directing land use, and the occasional lack of cohesiveness among the techniques, does not mean that the system itself is ineffectual or a failure; it simply means that it is not "comprehensive." It is not surprising that the system is not systematic or complete given our attitudes concerning

land as a private commodity and our desire to interfere in land-use decision-making as little as possible in meeting public interest objectives. The essential point, however, is not that the system is less than perfect, but that the system can and does achieve limited purpose objectives. For example, techniques and institutions are available to assure the provision of adequate streets in subdivisions, to separate so-called "incompatible" uses, to guarantee that new homes are not built in the right-of-way of a proposed road extension, and so on. By the same token, there are many land-use objectives for which there exist no adequate institutions or techniques.

3.4 Introducing Environmental Objectives into the Land-Guidance System

When asking whether environmental objectives can become an integral part of the present land-guidance system, the answer, as usual, depends on the particular objective. If, for example, the objective is to guarantee that all future development in a metropolitan area is located so as to achieve air quality standards, then the answer would have to be no. Metropolitan and regional planning agencies simply don't have the expertise or resources to make this kind of guarantee, and there is no way of assuring that each of the individual jurisdictions which make up the metropolitan area would voluntarily submit to the fulfillment of this metropolitan-wide objective.

If different environmental objectives are advanced, then the system could respond by internalizing those objectives with little or no difficulty. And, in fact, discussion need not be hypothetical, since environmental objectives are already incorporated into many of the techniques now in use, including:

1) Performance standards have been designed to classify industries by their environmental impact, i.e., to separate the heavy polluters from cleaner industry and other residential and commercial activities.

2) In recent years, flood-plain zoning has been used both to protect life and property from the ravages of floods and to maintain the carrying capacity of streams in periods of high water flow to minimize downstream damage. The Federal Flood Insurance Program has provided an incentive for the use of this type of zoning.

3) Most subdivision regulations which permit septic tank sewage disposal require percolation tests to determine the ability of the soil to handle on-site disposal; in fact, many subdivision regulations prohibit on-site disposal entirely.

4) Hillside development or grading regulations have been used to preserve the integrity of slopes and reduce erosion and sedimentation.

5) The purchasing of easements or development rights has been used to preserve open space and other scenic areas.

6) Agricultural zoning and preferential assessment of farm land have helped to preserve prime agricultural land; although these techniques have not proven to be as effective in practice as might have been expected.

7) Special preservation districts in zoning ordinances have been designated as conservation zones to protect historically or architecturally significant areas.

Thus, while the existing system has some significant weaknesses, there does exist a broad array of techniques and institutions with the experience and potential capacity to aid in dealing with environmental questions.

3.5 The Responsiveness of Planners and Planning Agencies to Environmental Objectives

It is difficult to determine the response of planners to incorporating environmental analysis into their programs. Planners' concern for environmental issues may be illustrated by the control mechanisms mentioned earlier. There is also a traditional concern by a core of professional planners that planning needs to be more ecologically/environmentally oriented. Cursory investigations have suggested a general willingness by planners to consider environmental issues--if sufficient data and analytical tools were available. Generally, one could say that planners' concern for the environment has increased at least as rapidly as that of the general population, especially among those who have realized that the lack of an environmental perspective left a serious gap in the knowledge needed to make informed decisions. However, pressure to solve socioeconomic problems other than environmental problems and their expanding, though limited, budgets suggests that specific guidelines, technical assistance, sources of funds, and possibly legal requirements may be helpful in assuring adequate consideration of environmental quality in planning decisions.

Given some basic capacity and likely receptivity by planners to environmental concerns, there are a variety of formal and informal, long-range and short-range ways to get planning agencies to use environmental information and techniques in their programs, and to include environmental quality as a key objective; such as:

1. Increase public concern and hence put direct pressure on planning agencies.

2. Increase public pressure for environmental planning in such a way that policy making bodies, state and local governments, require that a more intensive environmental planning effort be made by planning agencies.

3. Have the professional planning societies such as ASPO and AIP encourage their members to broaden their environmental perspective and offer them advice and information.

4. Expand the curricula of planning schools and offer a continuing education program in environmental planning.

5. Amend state planning enabling legislation to require that environmental studies be undertaken by all planning agencies, and to assure that environmental quality becomes a key objective of planning.

6. Make environmental considerations a requirement of grants-in-aid, especially by the federal government upon whom so many planning agencies depend. For example, requiring them to review environmental impact statements has forced this concern upon metropolitan and regional clearinghouses.

4. HISTORICAL PERSPECTIVE OF ENVIRONMENTAL CONTROL PROGRAMS

The preceding chapter presented a brief historical perspective of urban and regional planning in terms of the feasibility of integrating environmental protection considerations into the present land use planning process. This chapter is concerned with the other side of the question. in that it provides a historical perspective of environmental control programs, and addresses the question of whether land use guidance and control can be integrated into the traditional environmental protection process.

The evolution of the present environmental control program can be described by the history of enabling legislation which authorized these programs, the creation of institutions to execute the provisions of this legislation and the process by which these institutions created environmental control procedures. Since the problems encountered in establishing air quality, water quality and solid waste disposal programs differ significantly, the legislative history, institutional response and planning procedures have also varied. The nature of these legislative, institutional and planning programs will, to a large degree, determine the ease with which environmental protection agencies can incorporate land use planning and control objectives into their present programs.

4.1 Environmental Protection Legislation

The development of environmental protection and enhancement measures in the United States has been determined to a considerable extent by federal legislation. This has encompassed the whole range of environmental insults from air pollutants to solid waste, but has, for the most part been formulated as an array of single-purpose legislative instruments, each directed toward some specific pollution problem.

Water Quality Legislation

The modern legislative approach to the problems of environment begin with the Water Pollution Control Act of 1948. With the amendment of this Act in 1956, an enforcement procedure, consisting of a conference hearing/court action process, was provided for water pollution abatement. Financial aid in the form of grants and loans were also provided under the Act. The federal Water Pollution Control Act of 1961 strengthened federal enforcement procedures.

The Water Quality Act of 1965 required the states to establish and submit water quality standards for all interstate waters and a plan for the rapid achievement of the standards. These standards became the basis for most actions under the federal Water Pollution Control Act, including planning activities, the awarding of construction grants and enforcement practices.

The 1966 Clean Water Restoration Act provided for expanded research in advanced waste treatment and provided a grant system to support the establishment and maintenance of river basin planning based on water quality standards. The Act also vastly increased authorized expenditures for municipal waste treatment works construction.

In late 1970, the President announced a new program to control water pollution through the permit authority of the Refuse Act of 1899. The Refuse Act outlaws discharges and deposits into navigable waters without a permit from the Secretary of the Army. The program makes a permit mandatory for all industrial discharges into navigable waters of the United States. Violators of standards--including standards imposed by the EPA when federal-state or state standards do not apply or are clearly deficient--are ineligible for permits and liable to enforcement proceedings. The Water Quality Improvement Act of 1970 further provides that any federally regulated activity must have state certification that it will not violate water quality standards.

Air Quality Legislation

Federal legislation related to air pollution began in July 1955 when Congress authorized a federal program of research on air pollution and technical assistance to state and local governments. The Clean Air Act of 1963 and the Motor Vehicle Act of 1965, augmented by the Air Quality Act of 1967 and culminating in the Clean Air Act Amendments of 1970, represents the most significant federal legislation regarding air quality. The 1970 Amendments, as the strongest air pollution control legislation, authorize the regulation of both mobile and stationary sources of pollution. The most important sections of these programs deal with establishing national air quality standards, describing a framework for the states to meet these standards, and improving procedures for federal enforcement. The EPA has thus far set national air quality standards for particulate matter, sulfur oxides, carbon monoxide, photochemical oxidants, hydrocarbons, and nitrogen dioxide. Federal Guidelines have been published by the EPA requiring that states submit implementation plans for the attainment and maintenance of these standards.

The 1970 Amendments also provide for more effective federal enforcement by providing the EPA authority to issue compliance orders to any person violating applicable implementation plans or to bring civil suit against any person in violation of implementation plans, and authorize citizen suits to enforce the provisions of the Clean Air Amendments.

The Clean Air Amendments are an example of a recent shift in the burden of proof in pollution control. When the EPA now specifies that an air pollutant is a health hazard, industry must either comply with the emission standard, or prove that the health hazard does not exist.

Solid Waste Disposal Legislation

The Solid Waste Disposal Act of 1965, the first legislation aimed at solid waste management, is directed primarily at the loss of natural resources which solid waste represents. This Act authorized a research and development program with respect to solid waste to promote the demonstration, construction, and application of solid waste management and resource recovery systems. In addition, the Act provides financial and technical assistance to states and local governments and interstate agencies in the planning and development of resource recovery and solid waste disposal programs, and promotes a national research and development program for improved solid waste management programs.

The Resource Recovery Act of 1970 put a new emphasis on recycling and reusing waste materials by authorizing funds for demonstration grants for recycling systems and for studies of methods to encourage resource recovery. This Act also requires the EPA to publish guidelines for construction and operation of solid waste disposal systems.

In a further move to institutionalize the concern for the protection of the environment, the Congress passed the National Environmental Policy Act of 1969 (NEPA) establishing a national policy for the environment and providing for the Council on Environmental Quality. In recognizing the effect of man's activities on the environment, NEPA laid down the environmental impact statement requirements for federal agencies which propose to undertake activities that are likely to affect environmental quality.

4.2 Environmental Protection Institutions*

The recent environmental protection legislation has required the organization or reorganization of environmental programs at the federal, state and local levels in order to cope with the increased regulatory requirements of these legislative programs. An interacting set of federal, state and local environmental institutions has been established as a consequence of the reorganizations.

Federal Activities

Pursuant to Reorganization Plan 3 of 1970, the Environmental Protection Agency (EPA) was established on December 2, 1970. The EPA was created to permit coordinated and effective government action to insure the protection of the environment. EPA's mission is to define, achieve, and maintain environmental quality by abating and controlling pollution from point sources by utilizing a wide range of intervention strategies. These strategies include standard-setting for media programs, enforcement, monitoring, financial assistance, technical aid, planning, research, method

*This section summarizes discussions contained in the CEQ 2nd Annual Report, Chapters 2 and 3.

development, and review. The reorganization consolidated into one agency the federal programs dealing with air pollution, water pollution, solid waste disposal, pesticide regulation and environmental radiation.

The EPA has organized to cope functionally with related environmental programs. The media and categorical programs are supervised by two administrators: one assistant administrator supervises the air and water programs, a second administrator supervises the pesticide, radiation and solid waste programs. Three of the five assistant administrators have line responsibilities for the major functional areas--planning and management, enforcement, and research and monitoring.

Although the Council on Environmental Quality (CEQ) and the EPA work closely, their responsibilities differ significantly. The CEQ, as a staff agency in the Executive Office of the President, provides policy advice, and reviews and comments on the environmental impact control activities of federal agencies. The concern of CEQ is with the broad spectrum of environmental matters, while the EPA is a line agency with responsibility to administer and conduct federal pollution control programs.

Local and State Environmental Protection Agencies

This discussion focuses on state rather than local activities because federal legislation has put more and more responsibility at the state level. In the past, environmental programs in most states were fragmented or scattered throughout many state agencies, boards and commissions. In many cases, air and water pollution control programs were lodged in a state health department. Water pollution control programs were often incorporated into water resource management or public water supply programs. Pesticide regulation was frequently under the health department or the agriculture department; solid waste management was frequently a responsibility of the health department.

Some states have reorganized to cope with the broad scope of environmental issues. New York, Washington, and Illinois enacted legislation which consolidates pollution control programs and streamlines pollution control authority. Illinois, for example, adopted a total reorganization of its environmental programs. Three functional entities were created by the state Environmental Protection Act of 1970. The Pollution Control Board sets standards and adjudicates enforcement proceedings. The Institute for Environmental Quality conducts long range policy planning and applied research. The Illinois Environmental Protection Agency prosecutes alleged violators before the Board, issues permits and provides technical assistance.

The performance of various states in regard to elements of air quality programs are shown in the following table. The elements listed refer to requirements of state implementation plans as specified in the Clean Air Amendments.

State Air Quality Program Elements*

Legislative Authority	States with Authority	States without Authority
1. Adopt emission standards and promulgate other regulations	54	0
2. Require information on processes and potential emissions from sources of air pollution	39	15
3. Issue permits for construction of new sources of air pollution	38	16
4. Inspect facilities causing pollution	52	2
5. Require emission information from polluters and make it available to public	20	34
6. Require monitoring of emissions by polluters	13	41
7. Issue and enforce compliance orders	51	3
8. Enjoin standards violators	52	2
9. Take special, prompt action in case of air pollution emergencies	44	10
10. Regulate land use and transportation to meet air quality standards	5	49
11. Inspect automotive pollution control devices	16	38

Source: EPA, Office of Air Programs.

The status of development of state water quality programs is summarized in the following table:

State Water Quality Program Elements*

Program Element	No. of States
1. Water Quality Standards	
Interstate (full federal approval with antidegradation)	46
Interstate (full federal approval without antidegradation)	1
Interstate (federal approval with exceptions with antidegradation)	4
Interstate (federal approval with exceptions without antidegradation)	3
2. Planning (based on water quality standards)	23
3. Permit System	
Municipal	46
Industrial	47
4. State Matching Grants	34
5. Routine Treatment Plant Inspection	46
6. State Monitoring System	49

Source: EPA, Office of Water Programs.

The "permit system" in the preceding table refers to the existence of enabling legislation to grant permits for discharges. "State Matching" refers to the availability of state funds to assist municipalities in building sewage treatment facilities. "Treatment Plant Inspection" refers to surveillance of the operation and maintenance of facilities at least once a year.

*Includes District of Columbia, Guam, Puerto Rico, and U.S. Virgin Islands. In some cases, figures are approximations based on best available data.

Solid waste management practices are also becoming increasingly regulated and less fragmented. As a result of the Solid Waste Disposal Act, as amended, statewide and regionwide solid waste management plans are being formulated. The progress of the state solid waste management plans funded under the provisions of the Solid Waste Disposal Act can be summarized as follows: 52 states are preparing a solid waste emission inventory, 42 states have prepared or are preparing a control plan and 17 states have submitted completed plans.*

Aside from these reorganizations and activities, many states have introduced innovation by providing new approaches to citizen involvement, waste management and its financing, pollution charges, and applications of new technologies. In addition, some states have increased control over types of land use in order to protect important geographic areas, such as wetlands, from environmental degradation; to restrict potentially harmful development and facilitate desired developments. It may be noted that only five states have authority to regulate land use to meet air quality standards and only twenty-three states have initiated comprehensive planning programs based on water quality standards.

4.3 Environmental Protection Planning Procedures

The process by which environmental control programs are being established by environmental protection agencies is becoming more and more associated with the creation of comprehensive "implementation plans" usually developed by state and local governments and reviewed by federal agencies. This trend reflects the growing recognition that environmental control programs must have clearly defined objectives and explicitly designate the legislation, administration, and resources required to carry out these programs.

Air Quality Implementation Planning

The air quality implementation planning process typically involves a systems analysis approach to air resource management. The nature of the air pollution problem is first determined by extensive monitoring and sampling of air quality. The comparison of observed air quality levels with National Ambient Air Quality Standards defines the magnitude of the problem. These observed air quality levels are the result of the stationary and mobile source emissions of the region under various local meteorological and topographic conditions.

Mathematical models, such as atmospheric dispersion models, are then employed to evaluate alternative emission controls and to select a set of control regulations which both achieve and maintain the National Ambient Air Quality Standards. These emission control regulations define the emissions of a given pollutant permitted from a particular source type; for instance, different particulate emission control regulations may be designed

*Source: EPA, Office of Solid Waste Management Programs.

for fuel combustion sources, process sources and solid waste incineration systems. In developing control regulations, consideration must be given to pollution control technology, fuel resources, and the economics of pollution control. Additional consideration must be given to the impact of growth on achieving and maintaining National Ambient Air Quality Standards. Besides emission controls, land use and transportation controls may also be instituted as part of the array of control regulations.

In addition to an evaluation of control regulations, the plan typically contains the following elements: air quality and emission data, legal enabling authority, compliance schedules for emission sources emergency episode plans, air quality surveillance network description, permit system description, intergovernmental cooperation between adjoining states and the state and local agencies, and, lastly, the fiscal and manpower resources required to implement the program.

To assist in implementation planning, a comprehensive set of analytic tools has been developed. These tools include Rapid Survey Emission Inventory techniques for obtaining regionwide emission inventories; atmospheric dispersion models for estimating long-term and short-term air quality levels; growth trend projection models for determining the impact of economic development on emissions and air quality; transportation models from which mobile emission inventories can be generated; and, finally, system management techniques for determining the manpower and fiscal resources required to implement the plan.

Water Quality Planning Procedures

A similar unified planning requirements approach is developing in regard to water pollution programs through the EPA Waste Water Treatment Works Construction Grant Program and the HUD Water and Sewer Facilities Grant Program. The primary emphasis of these programs and the basis and rationale for all of the water pollution control activities which take place under their auspices is the attainment of established water quality standards. To promote the achievement of this key objective, planning guidelines have been published which describe the basic considerations to be addressed in meeting the EPA and HUD requirements. Grants for a water pollution control project shall not be made unless the project is an integral part of an effective basin and metropolitan or regional water pollution control plan. The pollution abatement plan must take into account anticipated growth of population and economic activity; present and future use and value of the waters within the planning area for water supplies, propagation of fish and wildlife, recreation, agriculture, industrial and other uses; adequacy of the waste collection system in the planning area, etc. The major objective is to establish a systematic water quality management planning procedure which includes land and water planning as well as the organizational and financial arrangements for executing the plan.

An array of analytic techniques and data is necessary in developing these implementation plans. Central to water quality management is data on water flows, pollutant discharges, and data required for forecasting future conditions and in-stream water quality. Water quality and treatment cost modeling is also required. In addition, demographic and economic development projections are required in order to determine the need for and scale of new waste water treatment facilities.

Solid Waste Disposal Planning

As a result of the Solid Waste Disposal Act of 1965 and the Resource Recovery Act of 1970, a comprehensive solid waste management planning process is developing. State solid waste management plans, funded under the Solid Waste Disposal Act, must include an inventory of waste disposal systems and a survey of problems and practices which can be used as a data base for planning. Under the provisions of the Resource Recovery Act, state solid waste management plans must include, wherever possible, provisions for recovery and recycling of solid wastes.

4.4 The Responsiveness of Environmental Protection Planners to Urban and Regional Planning Issues

In a preceding section of this document, the sensitivity and responsiveness of urban and regional planners to environmental protection issues was discussed. The feasibility of integrating land use and environmental protection is, to an equal extent, dependent on the receptivity of professional environmental protection program administrators, planners and engineers to the utilization of land use guidance and regulation as a means of pollution control.

Environmental protection personnel are likely to be as receptive, in principle, to the concept of environmentally-oriented land use control as are their counterparts in the planning agencies. It is nevertheless necessary to recognize that, with few exceptions, environmental protection personnel are professionally oriented toward the surveillance and inspection of individual sources of pollution, and enforcement of regulations which are generally based on the application of some form of discharge control technology. Recent federal inducements to introduce systems analysis techniques into the planning of air and water pollution control programs have had the effect of sensitizing many state and local control agency personnel to the need for and value of broadly based strategies for regionwide control activities. The addition of land use considerations to this process represents a new dimension of the planning problem. Many environmental planners are not as accustomed to developing and adhering to grand regional strategies as are their colleagues in the socioeconomic planning agencies and may find it difficult to adapt to this mode of activity.

5. ALTERNATIVE INSTITUTIONAL ARRANGEMENTS TO COMBINE LAND-USE PLANNING WITH ENVIRONMENTAL CONTROL

The previous chapters have outlined the history and procedures of land-use planning and environmental control programs. To a considerable extent, the development of these programs at all levels of government has been distinct and separate. Recently, however, two types of institutional arrangements have been employed which seek, in the first case, to integrate land-use planning and environmental control into one agency and, in the second case, to bring together opposing environmental and developmental viewpoints into an adversary-type confrontation to resolve environmental-land use issues. Since both methods of resolving such issues are still somewhat rare in practice, the evaluation of the effectiveness of these alternative arrangements is still difficult.

5.1 New Institutions Which Combine Environmental Protection and Land-Use Management

In recent years, some states have given themselves new powers and have created new regional bodies which combine the interests and techniques of land-use planning and environmental concerns. Some of these were significant modifications of existing powers and institutions, while others have been entirely new creations designed to respond directly and uniquely to the issues surrounding the relationships between environmental quality and land use. In general, these new institutions have different structures and functions; they respond to different and occasionally unique issues, and, in some cases, they have had little opportunity to prove their success or failure. On the basis of this limited experience, it is not possible to say that combining developmental and environmental management techniques in a single agency is a success or failure, but the existence of such institutions indicates that a joint response has already occurred in response to the need to integrate these activities.

These institutions are not yet numerous, but they exemplify the potential effectiveness of this approach when used in conjunction with more traditional technological pollution controls.

Hawaii--Statewide Zoning to Balance Conservation and Development Objectives

Hawaii's 1961 Land Use Law was a bold attempt at accommodating a rapid rate of development while maintaining the unique natural beauty of the islands. The law created the Land Use Commission and charged it with dividing the entire state into four districts: conservation, agricultural, rural and urban. Lands in each district were to comply with the regulations of different agencies, including conservation districts--the State Department

of Land and Natural Resources; agricultural and rural districts--the Land Use Commission; urban districts--regulations of local government. The Land Use Commission's responsibility has been, in the main, to rule on requests for changes in district boundaries.

Maine--A State's Response to Critical Environmental and Land Use Issues

Following the Alaska oil strike and the voyage of the Manhattan through the Northwest Passage, several major oil firms proposed using one of Maine's deepwater harbors as a site for a big oil refinery and storage facility. Recognizing both the inadequacy of local land use regulations to guide such development and the state's interest in certain critical areas, the state responded with several measures, including the Site Location Law and Coastal Conveyance of Petroleum Law. Under such Acts, the Environmental Improvement Commission may exercise the police power of the state to control the location of those developments substantially affecting local environment in order to ensure that such developments will be located in a manner which will have the minimal adverse effect impact on the natural environment of their surroundings. A development must meet four loosely-defined criteria related to pollutant control standards, traffic facilities, compatibility with natural environment and soil suitability. Although large commercial and industrial developments are required to obtain permits from the Commission, subdivisions in excess of twenty acres and residential developments requiring effluent discharge permits have made up over 80% of the Commission's workload.

Vermont Environmental Control Law

The Vermont Legislature saw that the combination of two interstate highways and a sharp increase in the number of second homes and ski resorts were certain to undo the state's rural character and its environmental heritage. To meet that threat, state officials in 1970 adopted the Environmental Control Law, which created an Environmental Board and seven Regional Commissions to see to it that most developments meet ten general environmental standards.

Under the environmental standards of the legislation, a development must not cause undue air or water pollution, unreasonable soil erosion, undue adverse effects in the scenic and natural beauty of the area, aesthetic or historical sites, or rare and irreplaceable natural areas, and must be in conformance with local, regional and state land use plans.

Tahoe Regional Planning Agency

Created in 1969 under a joint compact between California and Nevada and ratified by Congress, the Tahoe Regional Planning Agency is required not only to provide for orderly development in the Lake Tahoe Basin, but also to preserve the Basin's environment.

The compact calls for a plan to be enforced by minimum standards incorporated into 19 ordinances, including land use, subdivisions, grading, shoreline and tree cutting. The standards derived from traditional land use maps plus a computer derived land capabilities map that took into account and analyzed some 54 environmental variables. The standards are binding on the five counties and one city in the Basin.

San Francisco Bay Conservation and Development Commission

In 1965, the California Legislature recognized that if the many local governments surrounding San Francisco Bay continued to permit shoreline developments without regard for the Bay as a whole, the Bay would be ruined. As a result, the Bay Conservation and Development Commission was formed and was given authority to grant or withhold approval of shoreline development proposals on the basis of health, safety and welfare of the public in the region and of a plan which it was instructed to complete by 1969.

Hackensack Meadowlands Development Commission

The State of New Jersey in 1969 established the Hackensack Meadowlands Development Commission with jurisdiction over the 21,000 acres of largely undeveloped wetlands across the Hudson River from Manhattan. Although local governments can review the work and decisions of the Commission, it has final authority over planning and land use control over the region. In addition, the Commission can issue bonds, levy assessments, collect fees, buy land, and exercise Eminent Domain. It is authorized to use these instruments in furthering sound development and protecting the region from air and water pollution.

Metropolitan Council of the Twin Cities

Recycled sewage in a substantial portion of the wells, with other deficiencies, compelled the Minnesota Legislature in 1967 to transform a routine regional planning commission into the Metropolitan Council of the Twin Cities area, for its time the boldest experiment in metropolitan planning and development in the nation. The council's metropolitan perspective is made specific in its plan, the Development Guide, which is binding upon various agencies required to submit their plans to the Council and is advisory to local governments.

The council has appointed a Sewer Board which is responsible for developing the metropolitan sewer system in compliance with the Council's Development Guide and a Park Board responsible for fostering a metropolitan park system in close cooperation with the Council. Although several public work systems--highways, airports, transit, and housing--remained outside of the Council's direct authority, its responsibility for planning and development of the metropolitan sewer and park systems does give it an important influence over regional land-use issues.

The Council's independence is bolstered by several revenue measures. Funds for the Council and for the Park and Sewer Boards are raised from property taxes throughout the region. In 1971, the legislature passed a law intended to relieve fiscal disparities in the region by requiring that each local government therein must contribute 40% of the net growth of commercial and industrial property tax valuations to the Council for redistribution to various local governmental units according to population and need. Fiscal measures such as this, similar in intent to the one in the Hackensack Meadowlands, are essential if regional resources are to be used effectively to resolve regional problems.

5.2 Separate Environmental and Development Agencies--an Alternative to Functional Integration

In theory and practice, there is an alternative organizational approach to addressing the relationship between planning effectively for land-use development and for environmental quality, which avoids the integration of these historically distinct activities. The governing body at the local, regional, state and federal levels could create two governmental units--one to represent orderly and efficient development, and another improvement in the quality of the environment. In practice, a department like Planning, or Planning and Economic Development, or Economic Development, would espouse the goals, principles, standards, and procedures for the best kind of land-use and economic development. And a governmental unit such as an Environmental Protection Agency, Department of Conservation and Natural Resources, or Conservation Commission; would be an advocate for protecting the ecological/environmental system.

The premise behind this organizational form is that the relationship between orderly development and environment quality can best be understood and dealt with by building into the government system a strong proponent for conservation and another for development. Then the elected public officials can take from both of their strategies to mold the best public policy bearing on that relationship. This adversary technique, of course, has been the central rationale and means for obtaining justice in our court system. At the federal level, institutions such as the Department of Commerce and the Department of the Interior often function as adversaries. In state government, a governor can draw on the counsel of a Department of Economic Development and a Department of Conservation and Natural Resources. Mayors and city councils have both their Departments of Real Estate and of Parks.

6. THE NEED FOR ANALYTICAL TOOLS TO EVALUATE THE RELATIONSHIP BETWEEN LAND-USE AND ENVIRONMENTAL QUALITY

The need for a better understanding of the relationship between land-use and environmental quality is reflected in the legislative and administrative program of land use guidance and environmental protection described in the preceding chapter. The basic premise which underlie such programs is that an institutional framework is necessary to allocate or regulate the use of land, beyond the present land market mechanisms, in order to avoid undesirable environmental impacts.

Ideally, the policies adopted by such institutions would be based on extensive body of knowledge regarding the nature of these impacts and the alternative methods of controlling environmental damage due to present land use practices. In point of fact, this relationship is not, at present, well understood. Analytical and planning tools have, however, been developed which can be used to assess certain land use policy options and evaluate some of the aspects of the land use-environmental quality relationship. The description of these tools in the following pages is intended only to illustrate a few of the analytical and planning techniques that are presently available. It is not meant to characterize the vast amount of research in the fields of land use economics, urban geography, the geophysical sciences, environmental systems planning, etc. that has generated the body of knowledge on which an environmentally oriented land use policy must ultimately be based.

6.1 Present Analytical Tools for Evaluating the Relationship between Land-Use and Environmental Quality

A fairly substantial array of planning techniques are available and have been used to design and evaluate air and water pollution control implementation plans. These include computerized information management systems such as the STORET system for water data and SAROAD and APICS systems for air data, and multiple source computerized air pollution dispersion models such as AQDM/IPP. The latter have been used to simulate the relationship between point and areawide emissions, meteorological phenomena and ambient air quality in urbanized regions. Control regulations have been and are being based on analyses performed with these models. Analogous water quality models have been applied in many river basins, including the Delaware, Susquehanna, Colorado, and Columbia. Current EPA air and water pollution control planning guidelines emphasize the operational use of such models to design and test environmental control strategies and regulations.

Serious attempts to develop land use models to support transportation system and regional planning activities began over twenty years ago, and an

array of land-use-oriented transportation demand models are now used routinely by regional transportation planning agencies. However, techniques which relate land use and environmental quality have not yet reached the state of operational readiness that the more conventional air and water quality data systems and models have attained. In part, this is due to the complexity of the problem of reducing the milieu of economic, demographic and spatial interactive forces influencing regional land use into a realistic model that can be used to simulate the land development process. In part, this deficiency is due to the fact that the need for such techniques in environmental planning has only recently become evident.

Among the more recent attempts to bridge the gap between land use planning and pollution control planning techniques are the EPA-sponsored New Jersey Hackensack Meadowlands project, in which a conventional atmospheric dispersion model is being used to evaluate the impact of alternative land use plans on ambient air quality. At Argonne National Laboratory, the EPA Office of Land Use Planning is developing an atmospheric dispersion model that is specifically designed for the evaluation of land use plans and the design of land-use-based emission controls. Both Stanford Research Institute and Argonne have developed versions of a vehicle emission simulation system which is interfaced with a standard, land-use-based transportation demand model. The Argonne system is currently being used to evaluate alternative vehicular emission control strategies for the state of Illinois.

These efforts notwithstanding, a comprehensive land-use-oriented environmental data system, combined with regional development and environmental quality planning models, is not yet available.

Although no comprehensive planning tool has yet been developed, considerable work has been done on many of its major component parts. Among the more critical subassemblies which would be integrated within a comprehensive environmental planning model are:

1) An econometric model which includes such elements as export and local demand for goods and services; demand for the factors of production; investment in manufacturing and nonmanufacturing sectors; and governmental fiscal activities. The Bell (1967) model of Massachusetts and L'Esperance (1969) model of Ohio are typical. A dynamic input/output submodel would provide the required disaggregation by producing sectors, and estimate transactions among sectors.

2) A multisectoral demographic model which describes births, deaths, migration and total population in terms of the observed inter- and intraregional behavior of these parameters. Models of this kind are described by Keyfitz (1968) and Rogers (1968).

3) A labor force supply model which reflects the size and structure of the regional labor force in terms of its origin, growth, and participation

rates disaggregated by sector, occupation, skill, age and sex. Elements of such a model have been discussed by Mincer (1966) and Bowen and Finegan (1965).

4) A land use and spatial allocation model which describes or simulates the distribution of industrial, commercial and residential activities. Lowry (1964), Garin (1966), and Cripps and Foot (1969) have developed versions of direct allocation models, while Alonso (1960), Muth (1969) and others have proposed models which emphasize economic competition for land and markets. Forrester's (1969) model is a notable example of a simulation designed to reflect the dynamical aspects of the urban development process.

5) Resource distribution models, such as the water resource management models described by the Harvard Water Resources Group (1963), the HYDRO water resource management code (Bugliarello, 1962) and Cohen's (1970) power demand allocation model.

6) Multimodal transportation demand models which simulate trip generation and distribution, modal choice and traffic assignment processes. The Baumol-Quant "abstract mode" model (1962) is an example of a statistical, multimodal origin-destination, trip generation model which reflects short-run economic influences.

7) Waste product generation and distribution models such as the multisectoral, PLANTSIM model and the "integrated puff" atmospheric dispersion model (Roberts, Croke, et al., 1970). Pyatt's (1970) Water Quality Model is typical of equivalent computational tools for water resource management planning.

In a few cases, some of the more critical components of the comprehensive regional model have been integrated to create major "subassemblies." A prime example of the latter is Czamanski's (1968) econometric-demographic model of Nova Scotia, which combines a recursive, multisectoral econometric model with an age and sex specific cohort survival model. Another example is the Susquehanna river basin regional model (Hamilton et al., 1969), which combines a crude but comprehensive planning and forecasting tool.

Choy (1969) has suggested a general structure for a model which includes most of the components described above. An augmented version of this conceptual model is shown in Fig. 1. Not all of the possible interrelationships, such as between transportation and pollution or between environmental quality and land values, are shown in order to avoid excessive complication of the figure.

6.2 Future Trends in Environmental Land-Use Research

Because of the complexity of a comprehensive regional environmental planning model and the extensive data base that is required to support it, it is unlikely that such a tool will become a reality in the foreseeable future.

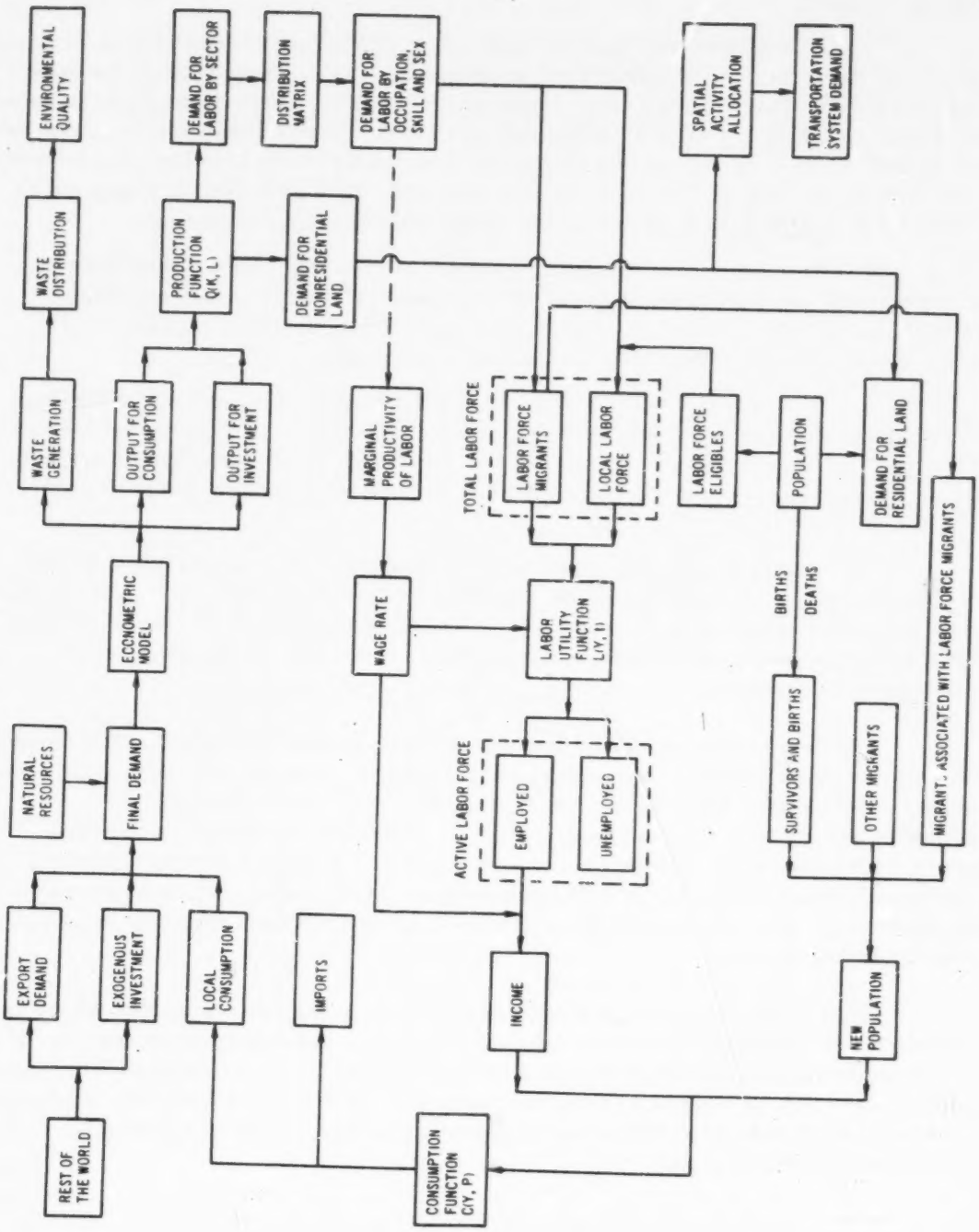

Fig. 1. A Regional Activity Model

It is not now a part of EPA research policy to undertake long-range programs directed toward the development of such comprehensive planning tools. The immediate need to supply environmental and regional planners with a practical array of analytical techniques precludes such a commitment at present.

On the other hand, research sponsored by the EPA and other agencies concerned with land use will result in the continuous development and upgrading of most of the key components of the comprehensive system. Thus, with the passage of time, regional development planners and local and state environmental protection planners will find that an increasingly effective array of land-use-oriented planning techniques are at their disposal.

Much of the technique development work that will be accomplished in the immediate future involves adapting data systems and analytical methods that are already in routine use by transportation and regional planners to meet the needs of environmental planners. A parallel line of development requires integration of the array of models and methods currently used by environmentalists into the urban and regional land-use planning process.

Very substantial improvements in the array of techniques available for integrating land use and environmental protection planning can therefore be expected in the comparatively near future, without substantial innovation or technological breakthroughs in either professional field. Moreover, it is safe to assert that the design of rational land-use-based environmental protection policies and programs could begin now, on the basis of currently available data systems and analytical techniques. In this regard, the most immediate need is for the development of planning guidelines for the states and regions and the proliferation of information concerning available techniques.

7. LAND USE AND ENVIRONMENTAL QUALITY-- THE FEDERAL ROLE

In addition to its traditional role in the management of public lands, the federal government currently engages in a broad range of land use-oriented activities conducted by a diversity of federal agencies. With the passage of the National Environmental Policy Act and the creation of the Environmental Protection Agency, the stage has been set for the integration of land use regulation and environmental protection. Current trends in national policy with regard to growth, land use and the environment enhance the likelihood that such a program will develop.

This chapter describes the federal agencies involved in some form of land use regulation, the framework for evaluating the environmental impact of federal programs and the legislative and programmatic activity of the federal government in establishing environmental land-use control programs.

7.1 The Role of the Federal Government in Land Development, Regulation and Utilization

A number of federal agencies are currently engaged in activities which, in one way or another, impact on land development and utilization, though not necessarily in the context of environmental protection or natural resource conservation. It is convenient to categorize these agencies in terms of whether their activities involve dealing with land as a natural resource, a location of functional activities, or a medium for the disposal of waste.

Agencies which have the responsibility of monitoring the use of land as a resource are primarily concerned with its capacity to supply various natural resources or to support different forms of economic activity. These agencies view land in terms of such characteristics as its mineral resources, soil structure, agricultural potential, forestation, natural scenic value, historical significance and open space capacity.

On the other hand, those agencies which consider land as a site of some functional activity are more concerned with the actual or potential activities which may take place on the land. This perspective is reflected in any federal regulation or agency which is concerned with recreational, residential, commercial, industrial, agricultural, transportation, utility or public service activities. (Note that these activity classifications are based on demographic-economic characteristics. No environmentally-oriented land use taxonomic system yet exists.)

Agencies which view land as a medium for the disposal of waste focus on its natural capacity to assimilate the various forms of waste which

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are generated as a byproduct of the economic activities which take place on the land. These include such considerations as air pollution fallout, contamination of natural receiving waters due to surface runoff, pollution of ground water resources as a result of land disposal practices, acid mine drainage, etc.

Other than the EPA, the key federal agencies which currently have responsibilities in one or more of these areas include the departments of Commerce, Defense (DOD), Interior, Agriculture, HEW, HUD and Transportation (DOT), as well as the Atomic Energy Commission (AEC), the Federal Power Commission (FPC), and the Office of Economic Opportunity (OEO).

Since the alternative ways of considering land are closely related, it is natural that in many cases, the same agencies play a significant role in all three of the categories suggested above.

As a result of the National Environmental Policy Act (NEPA), all of these agencies are now required to assess the environmental impact of their activities. To this extent, land use management and environmental protection have been legally, if not organizationally, integrated at the federal level. The following section describes this framework for including environmental considerations in the activities of federal agencies.

7.2 The Framework for Assessing Environmental Impacts of Federal Programs

As a result of recent federal legislation, in particular, the National Environmental Policy Act (NEPA), environmental considerations are incorporated into the federal decision-making process and programs. NEPA provides the broadest mandate for environmental protection in Federal Government actions and follows chronologically other environmental protection laws aimed at specific federal programs. Some of the latter are listed in Table I.

With this package of environmental protection legislation as a background, NEPA provides a framework for environmental decision-making at the federal level. NEPA established environmental impact statement requirements in Section 102(2)(c). These have now been supplemented by guidelines from the Council on Environmental Quality. A federal agency proposing a major action with significant environmental impact must: describe the impact; study and describe alternatives to its proposal; obtain comments from environmentally expert federal, state and local agencies; and make public, in advance, its environmental analyses and the comments of other agencies.

TABLE I. Some Specific Federal Laws Relating to Environmental Protection

The Atomic Energy Act of 1954
The Department of Transportation Act of 1966
The Fish and Wildlife Coordination Act, as amended in 1958
The Wilderness Act
The Federal Power Act
The National Park Service Act
The National Historic Preservation Act of 1966
The Federal-Aid Highway Act of 1970
The Urban Mass Transportation Act of 1964, as amended
The Airport and Airway Development Act
The Multiple-Use Sustained Yield Act of 1960
The Clean Air Act of 1970
The Water Quality Control Act
The Refuse Act of 1899
The Solid Waste Disposal Act of 1965
The Resource Recovery Act of 1970
The Insecticide, Fungicide and Rodenticide Act of 1947
The Environmental Pesticide Control Act of 1971

The federal agencies with jurisdiction by law or special expertise to comment on environmental impacts of federal programs are summarized in Table II. Particular components (Administration, Office, Bureau) of the federal departments are involved, depending on the aspects of the environment affected. For actions affecting specific geographic jurisdictions, some

TABLE II. COMMENT MATRIX--Federal Agencies with Jurisdiction by Law or Special Expertise to Comment on Various Types of Environmental Impacts[a]

Category	Department or Agency											
	Agric.	Com.	DOD	HEW	HUD	Int.	DOT	AEC	EPA	FPC	OEO	ACHP
Air	X	X	X	X		X	X		X			
Energy	X		X		X	X		X	X	X		
Hazardous Substances	X	X	X	X		X	X	X	X			
Land Use and Management	X	X	X		X	X	X		X			X
Noise		X		X	X		X		X			
Physiological Health and Human Well Being	X	X	X	X		X	X	X	X			
Transportation		X	X			X	X		X			
Urban		X		X	X	X	X		X		X	
Water	X	X	X	X		X	X		X			
Wildlife	X					X			X			

[a]Environmental Quality, The Second Annual Report of the Council.

federal-state agencies are listed from which comment must be obtained. General categories in which these agencies have jurisdiction or special expertise to comment are delineated in the table. This "comment matrix" shows both the extent of the comment procedure and the depth in environmental issues of various federal agencies.

7.3. Federal Authority to Establish Environmental Land-Use Controls

Although EPA now has the legal authority to establish land use controls, this authority is at present limited, indirect, and in some areas, implicit rather than explicitly defined. This is attributable, in part, to the fact that land use has traditionally been viewed in the context of natural resource management, regional economic development or social welfare planning. Thus EPA currently shares the responsibility for land use planning and management with a number of other federal agencies having widely divergent missions. Foremost among these are the departments of Interior, Agriculture, Transportation and Housing and Urban Development.

The statutory authority for EPA to utilize land use as a pollution control mode is, at present, defined in terms of a number of enabling instruments which focus on specific elements of the National environmental protection program: These are summarized below:

Water Pollution Control

Section 18 CFR 601, 32-33, which derive their authority from Sections 8 and 22 of the Federal Water Pollution Control Act, as amended, prohibit EPA from making a construction grant unless a project is included in an effective current basin-wide plan for pollution abatement consistent with applicable water quality standards. The Office of Water Programs has promulgated Guidelines for Water Quality Management Planning, which define an acceptable plan. The Guidelines specifically require, in several sections, the employment of land use analysis as a tool of management planning and encourage the utilization of land use control devices as one of several methods of water quality management.

The Refuse Act permit program also has potential for the control of land use. Where a permit application is for an existing discharge, the impact of the action may affect only water quality. However, where the application is for a new discharge, action on the permit has a definite impact on land use because it approves, alters or disapproves location of an industrial discharge. Disapproval may often discourage industry (unless 100% treatment is envisioned) from locating in a particular area.

A number of bills that are intended to provide additional statutory authority for the control of water pollution are now before the Congress. For example, Senate bill 2770 requires that states have authority to prevent

construction of any new source which will prevent the attainment or maintenance of water quality objectives (Section 106), that states regulate the location, modification and construction of any facilities which result in any discharge or runoff of pollutants (Section 209) and that states and the federal government shall certify discharges (Section 401).

Air Pollution Control

Section 110 of the Clean Air Act specifies a number of factors the Administrator of the EPA must consider before approving an implementation plan. Two of these are:

1) Whether the plan includes land-use and transportation controls as may be necessary, and

2) Whether it includes a procedure for the review of the location of certain types of stationary sources of pollution.

Solid Waste Management

The EPA authority to regulate or promote land use planning as a solid waste management strategy is limited to federal facilities and to contingency agreements exacted through federal grant programs. Executive Order 11514 requires environmental impact statements on proposed federal activities accompanied by provision for public information, hearings, etc. This order allows EPA to control waste management activities and systems, prior to their establishment, at federal installations. Waste management requirements at federal facilities are also governed by Executive Order 11507; however EPA's extramural responsibility in this regard consists mainly of providing technical assistance where requested.

Other EPA solid waste management programs related to land use controls are authorized under the Solid Waste Disposal Act of 1965 and the Resource Recovery Act of 1970. Planning and demonstration grants are provided only if recipients agree to carry out certain commitments such as abandoning open burning and dumping, having an existing comprehensive solid waste plan (demonstration criteria), or accept a commitment to implement a solid waste planning program (planning grant criteria). EPA has no power to close open dumps, override local zoning, or establish solid waste facilities where local communities fail to do so.

Pesticide Control

The Federal Insecticide, Fungicide and Rodenticide Act of 1947, as amended, conveys no indirect statutory jurisdiction for environmental land use regulation. It focuses on testing and labeling of pesticides. The Federal Environmental Pesticide Control Act of 1971 makes the label directions binding and enforceable.

Radiation Program

The current EPA legal mandate for utilization of land use controls is very indirect. The Office of Radiation has authority (Section 274h of the Atomic Energy Act of 1954) to determine standards for atmospheric radiation concentrations beyond the boundaries of AEC licensed nuclear facilities. On that basis, AEC defines facility characteristics and specifications to achieve the results desired by EPA, as well as to substantially preclude nuclear accidents. Under this arrangement, EPA could specify proper zoning of the area around a facility as one of the design conditions for a nuclear power plant, nuclear fuel fabrication plants, nuclear fuel reprocessing plants and radioactive waste disposal site. However, direct authority (10 CFR 100) for establishing site criteria remains a function of the AEC.

Noise Program

The general provisions of the NEPA, Section 402C of the Clean Air Act, as amended, requires all federal agencies to consult with EPA regarding any proposed programs or activities which may create an environmental problem. This provision can be interpreted to include noise nuisances. Since the activities of other agencies, particularly the DOT, DHUD, and Department of the Interior, frequently involve land-use-oriented programs, EPA therefore now has, at least in principle, indirect responsibilities with regard to the control of noise sources through land guidance programs. Legislation which is currently before the Congress, in particular, house bill HR 11021 and Senate bill S1016, has been designed to provide EPA with specific authority to promote and establish noise abatement programs.

The Organization of Present EPA Land Use Programs

The EPA thus has a limited mandate to incorporate land use management into its environmental protection activities. Responsibility for this mode of pollution control has thus far been dispersed throughout its various media and categorical programs or treated within the context of EPA relationships with other federal agencies. The dispersed, and as yet, limited use made by EPA of land management as a pollution control mode reflects the somewhat disaggregated character of its statutory authority.

The Office of Water Programs sponsors research relating land use and water quality. Since it evaluates basin and regional water quality management plans, the Office of Water Programs maintains a direct relationship with the Department of HUD with which it shares responsibility for the disbursement of federal waste water facility construction grant funds. This relationship represents the first, and as yet the only, formal channel of communication, other than the A-95 review process, between the agency responsible for the national environmental protection program and local

and regional planning agencies. This joint EPA-HUD activity represents the nearest approach to date to the realization of a land use oriented inter-agency environmental protection program.

The EPA Office of Air Programs currently conducts and sponsors a number of research and planning projects which are directly or indirectly oriented toward land use planning and control. These include the development of traffic control strategies for six major cities which will be unable to meet carbon monoxide standards, the New Jersey Hackensack Meadowlands land use planning project and the Argonne National Laboratory air pollution land use planning technique development program. The Office of Air Programs also provides technical assistance and advice relating to such land use oriented activities as the impact of chemical spraying on agricultural land management and the feasibility of open burning as a tool for forest management.

The Office of Solid Waste Management Programs administers demonstration grant programs which are concerned with the use of land fill for halting erosion, reclaiming strip mines and wetlands. This office provides regional and interstate solid waste planning grants and promotes programs such as Mission 5000, which aims to eliminate and/or convert to sanitary landfills a total of 5000 of the more than 15,000 open dumps in the U.S. during the period FY 1971 to FY 1972.

The Office of Pesticide Programs has no activity studying or involving land use controls.

The Office of Radiation Programs reviews applications to the AEC for the construction of nuclear facilities to insure that these facilities will not violate atmospheric radiation standards. Although in the past, the EPA reviewers have generally recommended design modification rather than expansion of the land buffer, the latter approach is a potential option.

The EPA Office of Federal Activities is currently investigating a wide variety of land management practices at federal installations and on public lands. It has reviewed environmental impact statements for Department of Transportation highway projects, nuclear power plant sites, Corps of Engineers dredging and fill permits and HUD new community proposals.

8. TRENDS IN NATIONAL POLICY WITH REGARD TO GROWTH, LAND USE AND THE ENVIRONMENT

The preceding discussion has summarized the existing framework for the integration of environmental protection and land management at the Federal level and has described the nature of the available legal authority for the Federal EPA to promote and employ land use regulations. It is important to recognize that current trends in the development of national policy with regard to growth, land use and the environment are likely to exert a profound influence on the future of these programs. Some of these national policy trends are described in the following pages.

In his State of the Union message of January 1970, the President called for a national policy of balanced growth. A number of issues emerged in high level public discussion in response to this call: population size and distribution, the environment, education and consumerism, and the effects of basic scientific and technological development. These issues relate strongly to economic growth and the way national resources, both human and physical, are allocated.

8.1 Toward an Urban Growth Policy

A series of bills amending various programmatic legislation has been introduced that reflects the broad concern with balanced growth policy. Among some of the more significant measures which may affect the use of land and its relationship to the environment are included:

- Manpower Training and Mobility Assistance Act of 1970, which provides incentives for poor people to move to rural growth centers, or medium size cities and suburbs with labor shortages;
- Business and Industrial Location Incentives Act of 1970, that provides incentives for the location of new or expanded economic activity in labor surplus areas; and
- New Community Development Act of 1970, which provides for formulation of a national urban growth policy, the development of new communities, the establishment of rational urban growth patterns and the development of obsolescent or decaying inner city areas.

The Urban Growth and New Community Act directs the Domestic Council to prepare an urban growth report every two years beginning with February 1972. The report is to contain, for national urban growth;

1) information on trends,
2) summary of problems,

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3) evaluation of Federal efforts,

4) assessment of interstate planning,

5) review of State, local and private plans,

6) needs and actions to implement plans, programs and policies, and

7) further recommendations.

The report is the response to legislative findings that

a. growth and population redistribution has produced an imbalance that threatens resources and the environment,

b. Federal programs frequently produce these problems and need coordination, and

c. the Federal Government should assume responsibility for national urban growth policy, whose general goals are specified.

This act further provides for expanded varieties of public assistance to "new town" developments including interest guarantees for public agencies undertaking such development, planning grants, public facilities grants, etc. These provisions reinforce those of the Housing Act of 1968 for assistance to new towns "in-towns," ones located at a small community nucleus, new town metropolitan satellites and free-standing communities. There is considerable activity in this area with HUD guaranteeing almost $125 million in loans for six recently launched new towns.

8.2 Land-Use Policy

One of the inputs to Federal level discussion of land use policy is the Public Land Law Review Commission that was instituted by law in 1964. A series of legislative proposals for national land use policy have resulted. Major emphasis is on land that is in Federal ownership but privately owned land is also addressed. The bills include:

- Public Land Policy Act of 1971 (HR 7211) that undertakes to provide central guidelines for the use of Federally administered lands and to provide grants for State and local coordination of plans for such lands.

- National Land Use Policy Act of 1971 (S992/HR 4332) which concentrates on institutional reform of locally planned and regulated land. It requires the States to regulate and manage land use in areas of critical environmental concern: coasts and shorelines, historic and scenic areas, and places impacted by key facilities such as airports and highway interchanges. (This is the Administration's bill.)

- Land and Water Resources Act of 1971 (S632). This bill deals with the same issues as the Administration's bill but envisions a Federal level Land and Water Resources Council, and a series of River Basin Commissions, declared by the President, to coordinate plans. It specifies the content of Statewide plans.

- National Coastal and Estuarine Zone Management Act of 1971 (S582). This bill states a policy of conserving such zones. It provides for grants for the development by the States of management programs and their administration for coasts and estuaries.

8.3 Alternative Institutional and Organizational Systems for Environmental Land-Use Planning and Management

The national policy legislation described in the preceding section could result in the creation of new governmental institutions, but it is equally possible that the integration of land-use planning and environmental protection might be realized through alterations in present jurisdictional responsibilities among existing Federal, State, regional, and local agencies. The following discussion suggests some of the possibilities.

Centralized Federal Response

The relationships between equivalent agencies in Federal, State, and local systems of government have generally been fostered through a combination of:

1) Enabling legislation which defines the jurisdictional authority of related agencies at different levels of government, and

2) Federal and State grants-in-aid programs designed to subsidize socially desirable courses of action.

Such systems of complementary agencies, which discharge similar responsibilities at different levels of government, have proliferated in recent years. It is characteristic of these systems that a single Federal agency at the top of the hierarchy will promote research, formulate Federal regulations and disburse Federal grant funds to agencies at a lower level of government, for example, State or regional regulatory or planning agencies. Corresponding State agencies implement programs, develop State regulations and disburse State funds to regional and municipal agencies, etc. Such a relationship of Federal, State, and local interactions has developed in the National environmental protection program, where Federal EPA grants for implementation planning, State and local control agency development and waste treatment facility construction have provided an incentive for the development of desirable pollution control programs.

This general pattern of a hierarchy of mission-oriented complementary agencies is repeated in many other departments of government, and it suggests one possible approach to the problem of integrating land-use planning with environmental protection. That is, a single Federal agency could be assigned the responsibility and jurisdictional authority to develop and promote environmental land-use regulatory activities at the State, regional and local levels. The states would be required to develop appropriate environmentally-oriented land-use implementation plans, supported by adequate legal authority and administered by suitably equipped State and local agencies. A Federal grant program to induce appropriate planning activities and partially subsidize control programs could be established and administered by the designated Federal agency.

Decentralized Federal Response

It does not follow that the approach described above is the only, or even the most desirable, means of achieving environmentally-oriented land-use regulation at the State and local levels. The joint EPA-HUD wastewater facility construction grant program, suggests a somewhat less centralized alternative. Through the medium of the jointly administered grant program, a formal linkage between the EPA and its complementary agencies at lower levels of government and the HUD has been established. Wastewater facility grant applications from municipalities must be integrated within the context of basin and regional water quality management plans certified by both the State environmental protection agencies, which are complementary to the EPA, and by HUD--designated Area Planning Offices--the latter are the regional planning agencies which are complementary to HUD. Detailed planning guidelines were jointly prepared by EPA and HUD, and some of the analytical techniques required are supplied by EPA.

This approach could serve as a model for a more broadly based land-use-oriented environmental protection program in which similar liaisons are estab'ished between the EPA and its complementary Federal agencies. For example, an analogous arrangement between EPA and the Federal Department of Transportation (DOT) might be established for the disbursement of Federal transportation system construction funds. Not only would Federal construction grants be contingent on the preparation of environmental impact statements as is now the case, but it would also be necessary to demonstrate that proposed construction projects were integrated within environmentally-oriented regional land-use plans jointly prepared by State environmental protection agencies, regional planning agencies and the transportation planning agencies.

A less structured organizational response would involve the establishment of a series of joint interagency programs as described above, but within the context of the present disaggregated organizational structure that now exists in the Federal agencies. For example, instead of establishing a

single EPA environmental land-use planning office which would have responsibility for all waste management activities insofar as they are susceptible to abatement and control through land-use regulation, the responsibility for the establishment of interagency programs could be dispersed among the EPA Office of Air Programs, Office of Water Programs, Office of Solid Waste Management Programs, etc. In effect, the precedent established by the EPA-HUD wastewater facility construction program would be repeated for each of the media and categorical programs individually, and similar liaisons would be established between EPA offices and other Federal land-use-oriented agencies. Sets of guidelines, a planning grant mechanism and programs to develop and disseminate information concerning techniques and procedures for environmental land-use planning and regulation would be required.

Local and State Response

The alternatives described above are all characterized by what has become a classical pattern of Federal intervention in, or promotion of, State, regional and local activities in order to induce a socially beneficial result. Land-use regulation presents special problems in this regard, since, with the exception of Federal control of the use of public lands, it has traditionally been implemented at the local levels of government by municipal zoning boards and building departments, or as a result of the construction of highways, airports, wastewater collection systems, etc. The localized character of land-use regulation might be preserved but augmented to include environmental protection features if, instead of reproducing the classical Federal-State-regional-local hierarchy outlined above, the Federal posture were more analogous to that of the Atomic Energy Commission or the Federal Power Commission, which function in a regulatory capacity. In order to insure that the local and regional institutions which directly or indirectly regulate land-use employ appropriate environmental impact assessment techniques and conduct effective regulatory activities, the Federal Government could develop and disseminate guidelines, techniques and environmental reporting procedures. Once these were implemented at the local level, the Federal role would involve comparatively passive regulatory activities rather than active land management program administration.

9. IN SUMMARY

This document has outlined the case for integrating land-use planning and regulation with environmental protection, and has indicated some of the legal, institutional, organizational, and technical aspects of this approach to the preservation of environmental quality. The conclusions which can be drawn from it and from the present state of environmental land-use planning can only be of the most general nature, but from the examination of this issue it is clear that:

1. There is a growing recognition of the need to subject public and private decisions regarding land use to a much closer scrutiny with regard to their environmental implications.

2. A great deal of legislative and organizational activity has taken place in the past few years regarding this issue.

3. An array of evaluative techniques now used either for land-use planning or for environmental planning may be of potential use in formulating environmental land use policies.

4. If land use guidance and environmental protection objectives are to be integrated, programs for merging the procedures and practices of groups involved in these functions must be developed.

5. The feasibility of employing land use as a means of environmental protection, as well as its eventual effectiveness, will depend very heavily on how effectively appropriate liaisons can be established between responsible agencies at the Federal, State and Local levels.

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ACKNOWLEDGMENTS

This document was prepared by members of the staffs of the Center for Environmental Studies and Applied Mathematics Division of Argonne National Laboratory. The authors wish to acknowledge the assistance of the following individuals who have contributed their time and benefit of their experience to this study.

Jack Oppenheimer	Executive Secretary, President's Air Quality Advisory Board
Alan Levin	Executive Secretary, President's Water Pollution Control Advisory Board
Joseph Krivak	Office of Water Programs, EPA
Bernard Hyde	Office of Water Programs, EPA
Ronald Venezia	Chief, Office of Land Use Planning, Office of Air Programs, EPA
John Robson	Office of Land Use Planning, Office of Air Programs, EPA
Ralph Luken	Office of Program Development, EPA
Frank Covington	Region IX Office, EPA
David Calkins	Region IX Office, EPA